

**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554**

In the Matter of)	
)	CC Docket No. 98-147
Deployment of Wireline Services Offering)	
Advanced Telecommunications Capability)	

**REPLY COMMENTS OF
RHYTHMS NETCONNECTIONS INC.**

Jeffrey Blumenfeld
Vice President and General Counsel
Rhythms NetConnections Inc.
6933 South Revere Parkway
Englewood, CO 80112
303.476.2222
303.476.5700 fax
<jeffb@rhythms.net>

Glenn B. Manishin
Christy C. Kunin
Stephanie A. Joyce
Frank V. Paganelli
Blumenfeld & Cohen – Technology Law Group
1615 M Street, N.W., Suite 700
Washington, D.C. 20036
202.955.6300
202.955.6460 fax
<glenn@technologylaw.com>

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SUMMARY

Nothing in the record, and certainly nothing in the initial comments in this proceeding, should dissuade the Commission from acting within its clear authority to adopt a federal line sharing mandate and uniform, national spectrum standards for advanced services. The arguments raised in opposition are tired reiterations of decades-old telecommunications folklore, employed repeatedly by incumbent monopolists to deter technological advancement and increased customer choice. The ILECs' arguments are recycled fictions that the Commission should identify, answer and dismiss.

Merely incanting the mythology of "network harm" and "investment incentives" is not an adequate answer to the fact that line sharing and competitively neutral spectrum compatibility standards will foster competition, increase technical innovation, and decrease retail end user prices for advanced services such as xDSL. The contrast between the fictions presented by the ILECs in this and related Commission proceedings, and the real facts, is both clear and troubling, as illustrated in the following table:

FICTION	FACT
Fostering competition through network access will deter facilities investment in telecommunications.	Network unbundling has thus far spurred, rather than deterred, investment. As Bell Atlantic's own comments in the <i>UNE Remand</i> proceeding demonstrate, "a lot has changed during the three years since the Commission first created a list of network elements to be unbundled by incumbent carriers. Competing carriers have invested tens of billions of dollars to deploy their own facilities."*

* Bell Atlantic Comments, CC Docket No. 96-98, at 1 (May 26, 1999).

FICTION	FACT
Providing competitors with access to crucial network elements and functionalities is technically infeasible.	Incumbents argued in the <i>Local Competition</i> proceedings that adjacent collocation is technically infeasible. Yet Rhythms has numerous operational adjacent collocation arrangements with PacBell in California. Neither provider has experienced technical difficulties or degradation of service as a result of these collocation arrangements.
Permitting multiple carriers to provide services over the existing network will raise insurmountable operational issues.	Despite AT&T's initial objections to the contrary, the nation experienced a seamless transition to long distance competition without interruption of repair, billing or maintenance. In addition, as SBC admits in this proceeding, split billing among multiple carriers has afforded SBC customers the ability to receive voice services and advanced services over the same loop. SBC Comments at 2,13.
Introducing new technologies and services over the network will degrade existing voice and other current network services.	As the affidavit of Rhythms VP Rand Kennedy demonstrates, and as ILECs' own deployment of xDSL services shows, advanced services do not degrade network services. Instead, DSL is specifically designed not to interfere with POTS or any other services. The notion that ILECs must impose spectrum standards for xDSL technologies to "protect the network" is a fallacy.

Having confronted the fictitious rhetoric that abounds in this proceeding, the Commission can now focus on the facts. *First*, line sharing absolutely meets the 1996 Act's standards for UNEs, because it is a functional "capability" of the network, necessary for the provision of residential DSL services, the absence of which will materially impair the ability of CLECs to offer the services they want to provide. *Second*, line sharing is demonstrably technically feasible, as shown by the ILECs' own DSL provisioning practices and successful line sharing tests conducted by both Rhythms and Covad. *Third*, any "operational concerns" raised by ILECs are legally immaterial and rebutted by SBC's own service solutions, as well as the simple

approaches proposed by numerous parties, for inter-carrier coordination of the minor maintenance, billing and repair issues that surround line sharing. *Fourth*, line sharing will encourage deployment of advanced services, the only caveat being that the Commission must ensure cost-based rates for line sharing capabilities to prevent anticompetitive pricing practices.

The Commission has authority, expertise and cause to adopt rules governing spectrum compatibility for xDSL deployment on a national basis rather than by adherence to ILEC spectrum standards or unreviewable deference to industry standards. Spectrum interference, or “noise,” is a reality of wireline communications that has existed since the first telephone; it is also a virtual impossibility that DSL services could ever interfere with POTS. The Commission can – as it has with Part 68 rules – both maintain the integrity of the network and encourage rapid deployment of advanced wireline technologies by implementing preventative spectrum compatibility rules. Aggressive, ILEC specific spectrum management rules – in particular binder group management and selective feeder selection – are both unnecessary and anticompetitive. Rather, the Commission should actively participate in industry standards-setting bodies, such as the ANSI Working Group T1-E1, to encourage adoption of competitively neutral power spectrum density masks and line deployment rules that the Commission can consider on an expedited basis in a national rulemaking forum. Only through direct Commission participation, including a formal process where all interested parties may comment, can competitively neutral spectrum compatibility policies be assured.

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Rhythms NetConnections Inc. and the ACI Corp. family of subsidiaries (collectively “Rhythms”), by their attorneys, submit these reply comments pursuant to the Commission’s *Advanced Services FNPRM*¹ in response to claims by incumbent local exchange carriers (“ILECs”) that the Communications Act does not support a federal line sharing mandate and that ILEC-specific standards for xDSL services are required to protect network integrity.

INTRODUCTION

All the parties opposing line sharing display a common theme: a deliberate ignorance, or even misrepresentation, of the technical parameters of DSL technology and the practical operations of the telecommunications industry. The ILEC commenters have barraged the Commission with contentions that line sharing is dangerous, infeasible, and will cause tremendous operational difficulties, and have raised unsubstantiated “interference” concerns to support the asserted need for ILEC-determined spectrum standards. On the other hand, state commissions strongly urge the adoption of national line sharing mandates and the resolution of line sharing pricing on a national level. This group includes the California PUC, the only state commission to have

¹ *Deployment of Wireline Services Offering Advanced Telecommunications Capability*, First Report and Order and Further Notice of Proposed Rulemaking, CC Docket 98-147, FCC 99-48 (rel. Mar. 31, 1999) (“*Advanced*”

rejected line sharing under Section 251(c) of the 1996 Act. These state commissions are supported by a broad array of carriers, including Rhythms, NorthPoint, Covad, ALTS and others — as well as disinterested groups such as CiX — that have presented the Commission with the facts about DSL services, the feasibility of line sharing and the spectrally-safe xDSL technological standards already in place. These facts indicate that line sharing will encourage, rather than impede, deployment of advanced services and that the technical characteristics of xDSL technology do not require further spectrum compatibility restrictions, or “binder group management,” as suggested by the ILECs.

I. THE 1996 ACT UNAMBIGUOUSLY COMPELS A FEDERAL LINE SHARING MANDATE

Imagine for a moment where we would be today if the Commission had permitted the same kinds of anticompetitive atmospherics to prevail at the time of divestiture. Suppose that the regional Bell operating companies (“RBOCs”) had succeeded in arguing that operational issues — such as a lack of operations support systems, billing issues, coordination of multiple carriers offering services over the same line — made use of local lines by unaffiliated long distance carriers impossible, forcing customers to have two phones, one for long distance and one for local. It is easy to conclude that there would have been virtually no long distance competition. In fact, we are here today, having many choices in long distance providers and vigorous long distance price competition, precisely because the Commission refused to give heed to these types of nonsensical arguments. Today the Commission must do the same thing for data, and not allow a scatter of low-level noise over billing and easily resolvable operational issues to obscure the ba-

Services Order” and “*Advanced Services FNPRM*” respectively). By Public Notice released July 9, 1999 (DA 99-1351), the Common Carrier Bureau extended the deadline for filing of reply comments until July 22, 1999.

sic facts that line sharing is technically feasible, legally mandated and plainly in the public interest.

The fable of two phones, one for local and one for long distance, of course does not represent the true history of long distance competition, and seems absurd merely in the hypothetical. Yet, if the Commission were to accept the ILECs' opposition to line sharing, an equally absurd result would now occur. The idea that long distance and local services are incompatible on a single loop is ludicrous now that long distance competition is a thriving segment of the telecommunications market. So too will it be with line sharing, especially when the ILECs' DSL services, which are provided only as voice overlay services, become increasingly prevalent and amass significant market share in the advanced services market. Thus, the only real issue in this proceeding is whether CLECs will obtain the same functionality and be permitted to serve customers in the same manner. A federal line sharing mandate will resolve this issue.

There can be no reasonable debate that the Act and historical regulatory practice gives the Commission the authority to require ILECs to permit CLECs to provide advanced services over the same lines presently used by the ILECs for voice services.² The Commission's charge to regulate in the public interest requires that it mandate line sharing, as the benefits to the nation's consumers will be immediate and substantial. Nor is a great deal of discussion required to establish that, contrary to the arguments of the ILECs, line sharing meets the "necessary and impair" test for unbundled network elements ("UNEs") under Section 251 of the 1996 Act³ or, at the very least, the definition of an interstate special access service.⁴ And the inevitable ILEC hobgoblin of "operational concerns" belies the ILECs' own professed practices as well as simple

² See, e.g., 47 U.S.C. § 152 (1996); 47 U.S.C. § 251(d)(1).

³ 47 U.S.C. § 251(d)(2).

common sense. In sum, both the law and sound public policy remain staunchly in favor of line sharing in order to speed and encourage the deployment of advanced services.

A. A Federal Line Sharing Mandate Will Maximize Consumer Welfare

As amply demonstrated by the *Advanced Services* record, “line sharing is critical to preserving consumer choice for Internet offerings.”⁵ With line sharing, consumers can immediately enjoy competitive advanced services, such as DSL services, over their existing phone line without losing their primary local exchange carrier. In addition, as Rhythms explained in its opening comments, line sharing holds great advantages, especially for residential end users, because “unlike most corporate offices, the vast majority of these consumers do not have a second phone line already installed expressly for data services.”⁶ Line sharing thus affords consumers speed of access to advanced services, with minimal cost, and without suffering the penalty of losing their preferred voice carrier.

Line sharing will also promote the public interest by encouraging investment in advanced services. Contrary to the continued assertions by the ILECs (one of the ILEC fictions discussed in the summary),⁷ permitting CLECs to offer advanced services over existing, operational voice loops will increase competitors’ ability to broaden the reach of their networks by offering them more efficient means of reaching end users and by increasing the capital they can devote to building their own networks rather than paying unnecessary and artificial charges to the ILECs. At present, even though facing extraordinary financial and administrative burdens attendant with obtaining stand-alone DSL loops, Rhythms, Covad and NorthPoint have equipped more central

⁴ See, e.g., *GTE Telephone Operating Companies, GTOC Transmittal No. 1148*, CC Docket No. 98-79, Memorandum Opinion and Order (rel. Oct. 30, 1998), *recon.* FCC 94-41 (rel. Feb.26, 1999) (“*GTE DSL Order*”).

⁵ CiX Comments at 3.

⁶ Rhythms Comments at 3.

offices with DSL-related equipment than all of the Regional Bell Operating Companies and GTE combined. In addition, these data companies have developed their own network operations centers and points of presence throughout the country. Rhythms, Covad and NorthPoint are capitalized into the billion-dollar figures for the sole purpose of rolling out DSL services to American consumers as quickly as possible. Perhaps more importantly, dozens of regional and local DSL providers are popping up all across the country. The ability to line share will only fan this growing flame of competition while increasing the size of the potential market and lowering delivery costs. Granting these carriers access to line sharing will not deter, but will only encourage, more rapid deployment in every region of the nation.

B. The Commission Has Jurisdiction to Require Line Sharing Under the 1996 Act

It is uncontested that the Commission has exclusive jurisdiction over advanced services. The Commission has declared several times that advanced services are inherently interstate,⁸ thus falling within the Commission's traditional, well-recognized authority over interstate services. In addition, Section 706 of the 1996 Act specifically instructs the Commission to employ its local competition rules to accelerate deployment of advanced services.⁹ Thus, the remaining inquiry is only whether line sharing can be employed for the encouragement of advanced services under existing local competition regulation.

⁷ Bell Atlantic Comments at 2-6; BellSouth Comments at 14; GTE Comments at 4, 25-28; SBC Comments at 18-19.

⁸ *GTE DSL Order; Implementation of the Local Competition Provisions in the Telecommunications Act of 1996*, CC Docket No. 96-96, Declaratory Ruling in CC Docket 96-98 and Notice of Proposed Rulemaking in CC Docket 99-68, FCC 99-38 ¶ 12 (rel. Feb. 26, 1999).

⁹ 47 U.S.C. § 706(a).

1. Line sharing is plainly a “capability” of the network under the definition of UNEs in the 1996 Act

Operating from a false technical premise, GTE claims that line sharing does not satisfy the definition of a UNE as provided in Section 153 of the 1996 Act. GTE’s contention that “loop spectrum (whether at or above the voice frequencies)” is not “a feature, function or capability of the loop” is incorrect.¹⁰ As Rhythms,¹¹ @Link,¹² Covad,¹³ NorthPoint,¹⁴ ALTS¹⁵ and others¹⁶ have all demonstrated, line sharing is plainly a “capability” of the network because it supports the transmission of data on the loop facility. Indeed, if line sharing does not meet this test, then neither do loops.

2. Line sharing meets Section 251(c) requirements for UNEs

Commenters opposing line sharing all claim that line sharing does not meet the standards for unbundling set forth in Section 251 of the 1996 Act.¹⁷ More specifically, the ILECs claim that line sharing does not meet the “necessary and impair” test required of all UNEs.¹⁸ These arguments likewise have little merit.

The ILECs’ position stems from a fundamental misunderstanding of Section 251’s standard for unbundling. Rather than offer an analysis of the “necessary and impair” standard, which they chide the Commission for not having provided, the ILECs repeatedly state that CLECs are presently deploying advanced services using stand-alone loops.¹⁹ Bald assertions of facts as

¹⁰ GTE Comments at 18; 47 U.S.C. §153 (29).

¹¹ Rhythms Comments at 5.

¹² @Link Comments at 5 n.9.

¹³ Covad Comments at 19.

¹⁴ NorthPoint Comments at 26.

¹⁵ ALTS Comments at 11.

¹⁶ NAS Comments at 9.

¹⁷ Ameritech Comments at 2-6; Bell Atlantic Comments at 9; BellSouth Comments at 6-10; GTE Comments at 19-25; SBC Comments at 16-17; US West Comments at 16-22.

¹⁸ 47 U.S.C. § 251(d)(2).

¹⁹ Ameritech Comments at 3; Bell Atlantic Comments at 9; BellSouth Comments at 10; GTE Comments at 20-21; SBC Comments at 16-17; US West Comments at 19-20.

everyone knows are not a substitute for legal analysis of the statute. By arguing that line sharing fails Section 251 because CLECs have been able to enter the advanced services market to some degree, the ILECs are assuming that *any* ability to enter the market demonstrates that CLECs have not been impaired *to any degree*. Yet, as recognized by the Supreme Court, the Section 251 unbundling standard does not require total impairment of CLEC services.

Iowa Utilities did not instruct the Commission to re-determine UNEs according to a ‘total impairment’ standard. Justice Scalia’s Opinion requires the Commission to apply some limiting standard for unbundling, “taking into account the objectives of the Act and giving some substance to the ‘necessary’ and ‘impair’ requirements.”²⁰ Thus, in adopting line sharing as a UNE, the Commission must find only that line sharing is necessary and that CLEC advanced services would suffer some concrete, determinable burden without it.

As an initial matter, the Commission should approach this issue with a proper understanding of the requirements of Section 251. That section provides that

In determining what network elements should be made available . . . the Commission should consider, at a minimum, whether –

- (A) access to such network as are proprietary in nature is necessary; and
- (B) the failure to provide access to such network elements would impair the ability of the telecommunications carrier seeking access to provide the services that it seeks to offer.

47 U.S.C. § 251(d)(2).

The Commission stated in the *UNE Remand* proceeding that “the ‘necessary’ standard only applies to ‘proprietary’ network elements, and . . . the ‘impair’ standard applies to

²⁰ *Iowa Utils. Bd.*, 119 S. Ct. at 736.

‘nonproprietary’ network elements.”²¹ The definition of “proprietary” elements is “elements with proprietary protocols or elements containing proprietary information.”²² Under this interpretation, any network functionality having an associated ANSI standard, as line sharing has, is by definition a publicly known technology that cannot be considered proprietary.²³ Thus, by the Commission’s own construction of Section 251, line sharing satisfies the statutory definition of a UNE if it meets the ‘impair’ standard, that is, if the absence of line sharing as a UNE would impair CLEC advanced services.

According to the Supreme Court, CLEC services are not "impaired" if, for example, their profit margin merely decreases by one percent due to lack of a UNE.²⁴ In the case of advanced services, data CLECs are losing far more than one-percent profit margin without access to line sharing. This is not a situation in which “the business receives a handsome profit but is denied an even handsomer one,” *Iowa Utilities*, 119 S. Ct. at 735 n.11, but instead the inability to realize a profit in the first place. As ALTS explained, the absence of line sharing means that it “would be economically impossible for a competitive DSL provider to offer high-speed data services, at current market prices, at a profit” in residential and rural markets.²⁵ Indeed, the lack of a federal mandate for line sharing forces CLECs to purchase stand-alone loops at great economic and administrative cost, as the Commission has already acknowledged.²⁶

²¹ *Implementation of the Local Competition Provisions in the Telecommunications Act of 1996*, CC Docket 96-98, Second Further Notice of Proposed Rulemaking, FCC 99-70 ¶ 19 (rel. Apr. 16, 1999) (“*UNE Remand Second NPRM*”).

²² *Implementation of the Local Competition Provisions in the Telecommunications Act of 1996, First Report and Order*, 11 FCC Rcd. 15,499, 15,641 ¶ 282. (1996) (“*First Report and Order*”), *aff’d in part and vacated in part sub nom., Iowa Utils. Bd. v. FCC*, 120 F.3d 753 (8th Cir. 1997), *rev’d in part and aff’d in part sub nom/ AT&T v. Iowa Utils. Bd.*, 119 S. Ct. 721 (1999).

²³ ALTS Comments at 12-13; NorthPoint Comments at 26-27.

²⁴ *Iowa Utils. Bd.*, 119 S. Ct. at 736.

²⁵ ALTS Comments at 12.

²⁶ *Advanced Services FNPRM* ¶ 93.

Several of the ILECs contend there is no impairment because, as Bell Atlantic asserts, “competing providers of broadband services *already* can enter the market and compete on the same basis as the incumbents.”²⁷ This argument is both overstated and immaterial. First, as recognized by the Commission, ILECs *already* provide line sharing to their own retail DSL services, thus placing them at a distinct advantage over CLECs that cannot obtain line sharing. Secondly, it is ironic that Bell Atlantic makes this assertion when it has greatly impeded access to even stand-alone loops for CLECs within its region. So greatly, in fact, that Rhythms has raised its concerns to State Commissions regarding the delayed, faulty and cumbersome loop provisioning it has suffered in New York and Massachusetts.²⁸ For example, of the first 12 loop orders completed by Bell Atlantic for Rhythms in Boston earlier this year, 11 orders required months of escalation and finally intervention by a Vice President of Bell Atlantic before the unbundled loops were installed. In addition, Bell Atlantic’s stand-alone loop provisioning has so impaired Covad’s ability to provide DSL services that Covad has initiated an antitrust litigation against Bell Atlantic in federal court.²⁹

The Commission has tentatively interpreted the “impair” standard to mean that which causes a material increase in cost or provisioning time or a decrease in service quality.³⁰ According to the evidence presented here, as well as the uncontroverted fact that loops – and thus

²⁷ Bell Atlantic Comments at 1 (emphasis included). *See also* Ameritech Comments at 2; SBC Comments at 17.

²⁸ *E.g.*, The Affidavit of Paul Bannwart, ACI Corp., to the New York Public Service Commission in Case No. 97-C-271, *Petition of New York Telephone Company for Approval of its Statement of Generally Available Terms and Conditions Pursuant to Section 252 of the Telecommunications Act of 1996 and Draft Filing of Petition for InterLATA Entry Pursuant to Section 271 of the Telecommunications Act of 1996*.

²⁹ *Covad Communications Co. v. Bell Atlantic Corp. et al.*, No. 99-1046 (D.D.C. Apr. 27, 1999).

³⁰ *UNE Remand Second NPRM* ¶ 25. Rhythms submits that Section 251 and the Supreme Court’s opinion require only a “more than de minimis” impair standard for unbundling. *UNE Remand* proceeding, Rhythms Comments at 8.

line sharing functionality of loops – are available only from the ILEC,³¹ the absence of line sharing demonstrably impairs the ability to CLECs to provide advanced services. Certainly, given the recurring and nonrecurring costs associated with ordering and obtaining a stand-alone loop for DSL services, CLECs incur a material increase in the costs of providing services. For example, Bell Atlantic is now proposing loop “conditioning” charges, which in essence are payments to ILECs for removal of unnecessary loop attachments, that can reach \$4,000 per two-wire ADSL loop, depending on the number of bridged taps on the loop.³² In addition, Ameritech has imposed on ACI Corp., Rhythms’ subsidiary, conditioning costs for individual loops of \$102,600 and even \$349,200.³³ By any standard, these rates for stand-alone loops impair CLECs in offering DSL services to American consumers.

It is no defense to such financial impairment to argue that CLECs “like incumbents, . . . are free to recover their costs for that unbundled loop through the provision of voice as well as data services.”³⁴ Forcing competitors to enter another service market to recover costs of facilities in their chosen market is anticompetitive.³⁵ The Department of Justice Merger Guidelines reject these “two-tier entry” arguments.³⁶ In addition, Section 251(d)(2)(B) links impairment to “the services that [the CLEC] seeks to offer,” not other services, such as voice services, that are not within their business plans. Therefore, the ILECs are incorrect in arguing

³¹ “There is no competitive wholesale market for copper loops. In addition, as described above, there are no effective substitutes for line sharing.” NorthPoint Comments at 27.

³² These charges are included in Bell Atlantic-New York’s proposed global amendment to its existing interconnection agreements that was forwarded to CLECs in June.

³³ Rhythms Supplement to Pre-Complaint Letter to FCC at 21-22 (July 16, 1999).

³⁴ Bell Atlantic Comments at 5. *See also* Ameritech Comments at 5; SBC Comments at 17; US West at 22.

³⁵ *See also* Covad Comments at 34-35.

³⁶ Section 3.4 of the Department of Justice Guidelines state that “entry, although likely, will not be sufficient if, as a result of incumbent control, the tangible and intangible assets required for their entry are not adequately available for entrants to respond fully to their sales opportunities.” Horizontal Merger Guidelines, Department of Justice and Federal Trade Commission (Apr. 2, 1992) (“Merger Guidelines”).

that line sharing does not "impair" CLEC advanced services because loop costs, however exorbitant, can be recovered by providing voice services over the same loop.

Further, as we noted in our prior comments, Rhythms believes that under the plain language of Section 251, *both* the necessary and the impair standards apply only to proprietary elements.³⁷ Subsection (A) of Section 251 states that the 'necessary' standard applies only "to those network elements as are proprietary in nature."³⁸ Subsection (B) goes on to reference "such network elements," with the clear antecedent of "such" elements being the *proprietary* elements of subsection (A). This unambiguous language indicates that Congress intended the Commission to apply the "necessary and impair" two-part test only to those elements in which ILECs have a proprietary interest. Indeed, under the 1996 Act's goal of opening the local network to competitors, it would seem counterproductive to place the onerous burden on CLECs to meet the Section 251 standards for network facilities in which ILECs claim no proprietary interest.

C. Line Sharing is Required Under the Nondiscrimination Requirements of Section 251

Section 251 of the 1996 Act, as interpreted by Commission rules, requires that any network functionality that incumbents provide to themselves must be available to competitors in a nondiscriminatory manner.³⁹ ILECs provide line sharing to themselves in order to offer their existing voice customers DSL services over in-service local loops. The ILECs have made this fact clear not only in their federal DSL tariff service descriptions, but also in their comments in this proceeding. For example, SBC proudly indicates that it has "over 30 such arrangements"

³⁷ See *UNE Remand Second NPRM*, Rhythms Comments at 5-6 (May 26, 1999).

³⁸ 47 U.S.C. § 251(d)(2)(A).

³⁹ Rhythms Comments at 6 (citing 47 U.S.C § 251(c)(2) and (3) and *First Report and Order*, 11 FCC Rcd. at 15,658 ¶ 312.

whereby it permits another carrier or ISP to provision DSL services over SBC voice loops under a split-billing arrangement.⁴⁰ Likewise, although Bell Atlantic is silent here, its interstate DSL tariff describes its services as a voice overlay service wherein “[t]he customer’s ability to make and receive voice calls over the copper facility is unaffected.”⁴¹ Given that the ILECs are already providing line sharing for their own DSL services, their refusal to provide line sharing to CLECs represents precisely the type of anticompetitive behavior that the nondiscrimination requirements of the Act were designed to prevent.

Therefore, the 1996 Act and Commission rules require that ILECs make line sharing available to CLECs. As Rhythms and several commenters have demonstrated, line sharing is not only technically feasible and in the public interest, it satisfies the UNE and nondiscriminatory standards of Section 251.⁴² Under the Commission’s previous orders addressing the nondiscrimination requirement of Section 251(c)(3), ILECs must provide to CLECs the same facilities and capabilities they utilize for their own services.⁴³ Since ILECs offer their DSL services over shared lines, they must make this functionality available to competitive CLECs. Therefore, the Commission should adopt line sharing as a UNE and require its provisioning under the terms of Section 251 and the Commission’s local competition rules.

⁴⁰ SBC Comments at 12-13.

⁴¹ Bell Atlantic Tariff F.C.C. No. 1, Transmittal No. 1076, Section 1 at 1 (Sept. 1, 1998); *see also* Rhythms Comments at 8 n.28 (citing BellSouth DSL tariff and GTE DSL tariff).

⁴² Rhythms Comments at 6; Covad Comments at 22-23; Intermedia Comments at 3; NAS Comments at 8-13; NorthPoint Comments at 25-26.

⁴³ *First Report and Order* 11 FCC Rcd. At 15,658 ¶ 312.

D. The Commission May Also Order That Line Sharing Be Provided as a Special Access Service

As several carriers have argued, line sharing may also be federally mandated as a special access service pursuant to the Commission's *Expanded Interconnection Orders*.⁴⁴ NorthPoint points out that a line sharing access service and line sharing UNEs can both be federally mandated by the Commission because they are not mutually exclusive.⁴⁵ These mandates could coexist just as do other elements, such as collocation and transport.⁴⁶ Importantly, the Commission must ensure that ILECs do not place restrictions on the ability of CLECs to use either UNE or access service line sharing in conjunction with their provision of their services.

The Commission already has designated DSL service as an interstate special access service because it meets the "ten percent" rule for private lines.⁴⁷ Thus, the Commission clearly has authority to mandate the provisioning of elements that are necessary to providing DSL as an interstate special service.⁴⁸ Several commenters propose the *Expanded Interconnection Orders* as an alternative basis for a line sharing requirement.⁴⁹ Indeed, mandating line sharing as an access service on this basis significantly reduces the Commission's inquiry in this matter.

Access services do not fall within the purview of Section 251. Thus, the necessary and impair standards have no bearing on whether line sharing can be deemed an access service. Rather, Section 201 of the Communications Act grants the FCC the authority to mandate open

⁴⁴ *Expanded Interconnection with Local Telephone Company Facilities*, CC Docket No. 91-141, *Report and Order and Notice of Proposed Rulemaking*, 7 FCC Rcd. 7369 (1992), and *Second Report and Order and Third Notice of Proposed Rulemaking*, 8 FCC 7374 (1993) (collectively "*Expanded Interconnection Orders*").

⁴⁵ NorthPoint Comments at 23-26; *accord* Rhythms Comments at 4.

⁴⁶ NorthPoint Comments at 23-24.

⁴⁷ GTE DSL Order ¶ 25.

⁴⁸ *Expanded Interconnection Orders*, 7 FCC Rcd. 7470.

⁴⁹ NorthPoint Comments at 24-25; ALTS Comments at 13-14; Covad Comments at 15-17.

access to the network for the provision of competitive telecommunications access services.⁵⁰

Section 201 provides that

It shall be the duty of every common carrier engaged in interstate or foreign communication by wire or radio. . . in accordance with the orders of the Commission. . . to establish physical connections with other carriers, to establish through routes and charges applicable thereto and the divisions of such charges, *and to establish and provide facilities* and regulations for operating such through routes.

47 U.S.C. § 201(a)(emphasis added).

Under Section 201, the Commission need only find that line sharing is in the public interest in order to issue a mandate that dominant ILECs provide line sharing as an interstate access service. As amply demonstrated by the majority of comments in this proceeding, enabling consumers to receive competitive advanced services via line sharing without losing the voice carrier of their choice is in the public interest. Just as mandating collocation for competitive access providers was in the public interest in 1992, so is mandating line sharing for competitive advanced services providers in 1999.

Should the Commission determine that line sharing can be required as an interstate access service, it must ensure that access services can be combined with UNEs. ILECs refuse to allow CLECs to combine UNEs and access services, claiming that such combination is unlawful under the 1996 Act. Further, ILECs may refuse to permit CLECs to order collocation out of “local interconnection” collocation tariffs on grounds that such collocation arrangements are meant only for provision of UNEs and not for access services.⁵¹ The Commission can resolve these issues by holding that ILECs may not differentiate in this manner between services provided

⁵⁰ *Expanded Interconnection Orders*, 7 FCC Rcd. at 7470.

⁵¹ For example, Bell Atlantic has created, in its South region, a new collocation tariff 218 issued pursuant to the Advanced Services Order collocation rules. These tariffs are available only to those CLECs that provide local service via UNEs.

over access and UNE facilities and requiring the ILECs to revise their federal collocation tariffs to comply with the collocation requirements of the *Advanced Services Order*. (In addition, the Commission should issue pricing guidelines for line sharing as an access service as described below in Section II.)

E. Line Sharing Is Technically Feasible

Every ILEC that is providing DSL services is doing so by sharing the line between voice and DSL. The fact that SBC and Ameritech are willing to offer line sharing to their forthcoming advanced services affiliates demonstrates their belief that line sharing is technically feasible.⁵² As NorthPoint observes, therefore, it is clearly technically feasible for two services to share the same line.⁵³ Technical feasibility is not affected by whose name is on the DSLAM equipment.

All credible evidence in this proceeding indicates that line sharing is, as the Commission tentatively concluded,⁵⁴ technically feasible. Successful line sharing experiments, which have included as many as twelve simultaneous phone calls transmitted alongside DSL service on the same loop, demonstrate this fact.⁵⁵ The ILECs, unable to refute the legitimacy of these tests or deny that they provide voice-DSL line sharing for themselves, now resort to making outlandish claims that line sharing between two carriers will degrade voice services.⁵⁶ The Commission need not fret over these baseless claims.

⁵² *Applications for Consent to the Transfer of Control of Licenses and Section 214 Authorizations from Ameritech Corporation, Transferor, to SBC Communications, Inc., Transferee*, CC Docket No. 98-141, Proposed Conditions to FCC Order Approving SBC/Ameritech Merger ¶ 33 (July 1, 1999) (“*Proposed Merger Conditions*”).

⁵³ NorthPoint Comments at 18-19; NAS Comments at 7; Rhythms Comments at 8; Covad Comments at 10-12.

⁵⁴ *Advanced Services FNPRM* ¶ 103.

⁵⁵ See Rhythms Comments, Attachments 1 and 2.

⁵⁶ “The Commission should not underestimate the seriousness of the harm to consumers that would be denied access to critical line of communication, including access to emergency services such as 911.” US West Comments at 15. See also Bell Atlantic Comments at 13; SBC Comments at 24.

With present technology, analog voice services and DSL services occupy completely distinct portions of spectrum.⁵⁷ Until they reach the “splitter function in the DSLAM,” which is a technically simple and inexpensive device, the two services peacefully coexist in simultaneous transmission from the DSLAM.⁵⁸ Indeed, ADSL was developed to “ride along with” the analog voice services in this way. And according to US West’s own explanation of loop functionality, the electronics that carriers install for DSL services use the loop in a vastly different way than electronics for voice services use loops.⁵⁹ The voice and data streams for ADSL transmit over entirely separate portions of the spectrum and, as such, ADSL “interference” with analog voice can no more occur than broadcast television signals can interfere with cellular telephones.

Similarly, the additional technical concerns that ILECs raise regarding testing and trouble-shooting of a shared line pose little problem. If SBC can discern whether its voice service or its DSL service is experiencing difficulty, then SBC and Rhythms can make the same determination. As the Commission has stated, there is no difference between ILEC voice-ILEC DSL line sharing and ILEC voice-CLEC DSL line sharing. “In both cases, consumers will receive two separate services from two separate providers (at least in terms of operational responsibility) over one copper loop.”⁶⁰

⁵⁷ It goes without saying that once IP telephony is deployed that voice and data will share a single line.

⁵⁸ For policy reasons, as opposed to technical necessity, it is preferable for the DSL provider to provide the splitting function. The DSL provider will have the incentive to provision splitters in the most efficient fashion. In contrast, ILECs are incented to impose as much cost as possible on their CLEC rivals, much as has occurred with respect to collocation.

⁵⁹ “If, for example, a carrier installs electronics to provide only a voice-grade channel, the loop spectrum will consist only of narrow voice-band frequencies. If, by contrast, a carrier installs RADSL [rate-adaptive DSL] electronics, then the spectrum generated on the loop will permit transmission of simultaneous voice and data signals[.]” US West Comments at 1.

⁶⁰ *Advanced Services FNPRM* ¶ 103.

F. “Operational Issues” Deserve No Weight in the Commission’s Consideration of Line Sharing

Operational issues are irrelevant as a legal matter to the Commission’s Section 251 analysis. As the *FNPRM* recognizes, a “determination of technical feasibility does not include consideration of economic, accounting, billing, space or site concerns.”⁶¹ Even if they were material, however, the ILEC’s purported operational concerns with data line sharing are insubstantial, unsupported and, in most respects, just silly.

Not only does historical experience tell the Commission that these concerns can and have been addressed at the operations level between carriers,⁶² but carriers have given the Commission working paradigms for dealing with these concerns. First, SBC refers to its practice of “split-billing” between telephony and advanced services that are provided over the same loop.⁶³ Secondly, and more concretely, both Covad and MCI WorldCom have described for the Commission a manner in which repair, maintenance and billing can be handled jointly by cooperating carriers.⁶⁴ As Rhythms stated in its comments, “[i]f the Commission orders line sharing, the industry, including the ILECs, will make it happen.”⁶⁵

In fact, the ILECs have already made line sharing happen for themselves. Bell Atlantic and US West have created separate sales divisions to serve DSL end users. These offices act independently in taking orders and handling customer issues. One cannot call the Bell Atlantic voice services line and order DSL. A DSL end user cannot call the Bell Atlantic voice services line and complain about its DSL service. This separateness does not, however, bring down the

⁶¹ *Id.* ¶ 97, citing 47 C.F.R. § 51.5.

⁶² See Rhythms Comments at 10-11. “Were the Commission to wait until final resolution of every operational issue arising from local competition, there would be no Commission orders on the matter at all.” *Id.* at 11.

⁶³ SBC Comments at 12-13.

⁶⁴ Covad Comments at 13; MCI WorldCom Comments at 12.

⁶⁵ Rhythms Comments at 11.

reliability of the network. These separate divisions of Bell Atlantic are able together to bring voice service and DSL service to the same customer over the same line. Presumably, they have devised a system for handling trouble and repair calls, are able to determine which service is experiencing the problem, and can resolve the call efficiently. All data CLECs are asking is for the same opportunity to coordinate with ILECs to provide quality service to their customers.

A few ILECs make special mention of the “complex and convoluted”⁶⁶ Operations Support Systems (“OSS”) issues that arise with line sharing.⁶⁷ Specifically, they state that “[e]xisting [OSS] do not have the inventory, provisioning, maintenance, etc. capability of handling two providers on a single local loop.”⁶⁸ The ILECs essentially argue that the FCC cannot order line sharing because ILECs have refused to develop the OSS that would make it possible. This cannot be the right approach, because it enables the ILEC to “gate” the availability of UNEs by refusing to make OSS available. Accordingly, the Commission should order the ILECs to provide line sharing and in the interim they will need to support that UNE in the best way possible while simultaneously developing the appropriate OSS systems to enable seamless, scalable implementation by CLECs.

II. THE COMMISSION SHOULD MANDATE COST-BASED PRICING FOR LINE SHARING

Whether the Commission mandates line sharing as a UNE or as an interstate access service, it should adopt pricing rules in this proceeding to prevent anticompetitive practices by the ILECs. Several parties recognize the tremendous opportunities for price squeezes that will

⁶⁶ Ameritech Comments at 10.

⁶⁷ Statement of Dr. Charles Jackson for Bell Atlantic at 8-11; BellSouth Comments at 19-20; SBC Comments at 20-21.

⁶⁸ SBC Comments at 20-21.

occur unless binding pricing standards are adopted.⁶⁹ As succinctly argued by NorthPoint, “pricing of these arrangements made available to competitive LECs will be critical to the success of this policy.”⁷⁰ To that end, CiX states that “[i]t is essential that ILECs properly allocate the costs of their DSL service to ensure that the costs of operating and maintaining the line are fairly apportioned among all providers, including the underlying ILEC.”⁷¹

In order to ensure fair pricing, the Commission should assert its authority to prevent ILECs from reaping a windfall in their line sharing rates. For example, SBC’s proposed Merger Conditions include a provision that imposes line sharing rates equal to 50% of SBC’s lowest monthly recurring loop charge plus 100% of the non-recurring charge.⁷² SBC emphasizes that “there is no discount for non-recurring charges.”⁷³ Thus, CLECs obtaining line sharing from SBC would pay the entire non-recurring charge for a loop *in addition* to SBC’s recovery of its loop costs via pass-through to its voice customers. The Commission should reject this type of pricing principle summarily, whether line sharing is mandated as a UNE or an access service.

The principle that ILECs must set line sharing rates at costs holds true in both the UNE and the access service context. Regardless of the pricing regimes historically associated with these separate services, price squeezes are illegal. Forcing competitors to pay more for a service than the incumbent pays for all service inputs is illegal. Therefore, the Commission should act pursuant to its clear authority to set guidelines for pricing line sharing in both the UNE and access service context.

⁶⁹ Rhythms Comments at 13; ALTS Comments at 17; CiX Comments at 6-7; NextLink Comments at 2; Covad Comments at 39-40; NorthPoint Comments at 28.

⁷⁰ NorthPoint Comments at 29.

⁷¹ CiX Comments at 6.

⁷² Proposed Merger Conditions ¶ 34.b.

⁷³ *Id.* ¶ 34.b.

A. UNE Line Sharing Prices Must Conform to Federal TELRIC Principles

Under the 1996 Act, the rates of all UNEs must be “based on the cost (determined without reference to a rate-of-return or other rate-based proceeding) of providing the interconnection or network element (whichever is applicable).”⁷⁴ To implement this standard, the Commission developed its Total Element Long Run Incremental Cost (“TELRIC”) guidelines,⁷⁵ which have been reinstated by the Eighth Circuit pursuant to Supreme Court remand in *Iowa Utilities*.⁷⁶ TELRIC is now once again the law of the land.

According to TELRIC, “the price of a network element should include the forward-looking costs that can be attributed directly to the provision of services using that element.”⁷⁷ In the case of line sharing, several commenters, as well as the Commission,⁷⁸ have noted that ILECs presently attribute zero loop costs to the provision of their DSL services.⁷⁹ In setting rates under TELRIC, commissions must first ascertain the attributable incremental cost for the use of the loop. To meet the nondiscrimination requirements of the Act, this cost is the basis of the TELRIC price. In filing their DSL tariffs, the ILECs were required to develop charges based on the incremental cost of the loop, which they ascribed to be zero in their cost studies. If after a line sharing obligation is imposed on the ILECs, they submit cost studies with a non-zero cost, then this is an admission that their present tariffs are illegal. In any event, when the cost for line sharing is developed, in order to comport with the nondiscrimination requirements of the Act, the ILECs must either, in the case where there is no separate subsidiary, impute the same cost to

⁷⁴ 47 U.S.C. § 252(d)(1)(A).

⁷⁵ 47 C.F.R. §§ 51.507 and 51.509.

⁷⁶ *Iowa Utils. Bd. v. FCC*, Case Nos. 96-3321 et al., Order (8th Cir. June 10, 1999).

⁷⁷ *First Report and Order*, 11 FCC Rcd. at 15,844 ¶ 672.

⁷⁸ *Advanced Services FNPRM* ¶ 106 n.226.

⁷⁹ Rhythms Comments at 13; Covad Comments at 39; NorthPoint Comments at 28.

their services or, in the case of a separate subsidiary, the affiliate must pay the same charges for line sharing that is paid by all other CLECs.

As ALTS has stated, it is unnecessary for the Commission to defer or delay a line sharing mandate in order to await permanent line sharing rates.⁸⁰ None of the *Local Competition* unbundling rules hinged on pricing matters.⁸¹ Rather, the Commission can, in its forthcoming Order in this proceeding, set TELRIC-based line sharing rates that will govern on a federal basis.

The Commission has authority under Section 251 of the Act and Section 51.513 of the Commission's Rules to set proxy prices on an interim basis for UNEs.⁸² Like TELRIC, this authority was reinstated by the Eighth Circuit pursuant to the Supreme Court's remand.⁸³ Thus, with the line sharing costing data already extant in the record, the Commission can determine line sharing rates pending final state commission pricing decisions. As the Commission has earlier stated, "it is critical for the near-term development of local competition to have proxies that provide an approximation of forward-looking economic costs and can be used by states almost immediately."⁸⁴ The Commission should apply a similar rationale to adopt proxy line sharing prices that adhere to economic cost-based TELRIC principles.

B. Line Sharing as an Access Service Must Be Priced at Just and Reasonable Rates

Should the Commission determine that line sharing will be required as an access service, the Commission has plenary authority to set permanent federal rates for line sharing. Under Section 201 of the Communications Act, the prices of access services "shall be just and reasonable, and any such charge, practice, classification, or regulation that is unjust or

⁸⁰ ALTS Comments at 18.

⁸¹ See generally *First Report and Order*, 11 FCC Rcd. at ¶¶ 828-836.

⁸² 47 U.S.C. §251(d)(1); 47 C.F.R. §51.513.

⁸³ *Iowa Utils. Bd.*, June 10, 1999.

⁸⁴ *First Report and Order*, 11 FCC Rcd. at ¶ 790.

unreasonable is declared to be unlawful.”⁸⁵ This statutory mandate for just and reasonable rates requires cost-based pricing.

The Commission should set federal line sharing prices that reflect costs. The Commission should adopt rates that do not permit ILECs to recover line sharing charges greatly in excess of their costs. If ILECs were to impose line sharing rates that exceed their costs, CLECs would be placed at a significant competitive disadvantage in providing low-cost DSL services. In addition, such excessive rates would serve as a “competition tax,” forcing the CLECs to subsidize the ILECs. Indeed, line sharing could become so expensive that stand-alone loops would be a lesser burden.

Rhythms therefore urges the Commission to adopt cost-based federal line sharing rates. Cost-based rates will encourage CLECs to bring advanced services home to consumers while ensuring that ILECs properly recover the just and reasonable rate of line sharing functionality. Only with such a mandate can the Commission ensure that line sharing remains a viable option for advanced services competitors.

⁸⁵ 47 U.S.C. § 201(b).

III. SPECTRUM COMPATABILITY AND MANAGEMENT

Spectrum compatibility and management is nothing more than the adoption of uniform and fair processes for addressing the natural physical characteristics of wireline communication. In particular, spectrum “interference,” or “noise,” has been a part of telecommunications for over a century. As the deployment of advanced wireline services has expanded, spectrum compatibility and management concerns have been raised to an unprecedented, and in many ways technically invalid level. The Commission should take this opportunity to consider a reasoned, national and competitively neutral approach to these issues.

A. The Technologically Neutral Spectrum Compatibility Rules of the *Advanced Services FNPRM* are Crucial to AWS Competition

1. The Commission’s basic presumptions are designed to ensure rapid build-out of advanced services.

In its *Advanced Services Order*, the Commission found that it “should establish certain rules on spectrum compatibility that will immediately facilitate the deployment of advanced services, until long-term standards and practices can be established.”⁸⁶ In doing so, it established a set of basic presumptions regarding spectrum compatibility and spectrum management that meet the Commission’s dual goals of supporting the development of competition in the advanced wireline services marketplace while protecting the quality of voice and data services to be offered over the legacy telephone networks across the nation. In particular, the Commission found that, so long as a particular technology has been approved by the FCC or any state commission, complies with existing industry standards, or has been successfully deployed by any

⁸⁶ *Advanced Services FNPRM* ¶ 66.

carrier without significantly degrading the performance of other services, a LEC may not deny a carrier's request to deploy the technology.⁸⁷

As a result, the burden of proof has shifted, and CLECs — at least theoretically⁸⁸ — are currently free to implement tried and true advanced services technologies without having, in each and every instance, to demonstrate the network “safety” of the technology in question. The Commission's creation of presumptions in favor of new entrants goes a long way toward offsetting the natural power imbalance that exists between incumbent LECs and those new entrants attempting to “negotiate” terms and conditions for interconnection with them. By directing that the default dynamic of xDSL deployment works in favor of the deployment of innovative new services, instead of overstated fears of network harm, the Commission injected a breath of fresh air into the lungs of local competition, thus addressing its obligation under the 1996 Act to promote the delivery of advanced services to all Americans.⁸⁹

The Commission's spectrum presumptions also provide the business certainty required to attract capital and make network investments to ensure that consumers get the benefits of innovation and choice promised by competition. Thus, the Commission's *Advanced Services Order* not only presented emerging data CLECs with a means for deploying their technologies in the face of barriers raised by the incumbent LECs, it also provided valuable support to the foundation of the freshly emerging competitive xDSL-based data services marketplace. Any capital-intensive business initiative is dependant, to some extent, on a reliance that the basic business assumptions of the market environment will not change significantly over the course of the investment. By affirmatively acting to take arbitrary spectrum management policies out of

⁸⁷ *Advanced Services FNPRM* ¶¶ 66-69.

⁸⁸ Unfortunately, despite the Commission's Order, new entrants such as Rhythms face continued ILEC-imposed deployment delays ostensibly related to spectrum management concerns.

the hands of the incumbents, the Commission created a groundwork of predictability regarding the ability of CLECs to deploy current and future advanced services technologies. This stability, in turn, encourages investment in competition, by freeing new entrants to focus resources on deployment issues rather than on fighting ILECs for permission to deploy previously successful technologies.

2. The Commission Should Reaffirm Its Spectrum Compatibility Presumptions

In setting its spectrum compatibility presumptions, the Commission assumed that this step would be sufficient until appropriate permanent standards could be established by industry.⁹⁰ Deviation now from the Commission's basic spectrum compatibility presumptions, without first establishing permanent, fair long-term rules, would have a severe, detrimental impact on competition in the advanced services marketplace. The Commission should therefore affirm the findings of the *Advanced Services Order* with regard to its spectrum compatibility presumptions.

As described in more detail below, the continued application of competitively neutral industry standards is a useful and efficient means of ensuring ubiquitous spectrum compatibility. The Commission's current presumption in favor of technologies that have been approved or deployed grants carriers two alternative methods to deploy their services in the face of potential ILEC opposition. These alternatives are necessary because technology development often moves faster than can standards-setting bodies. In particular, where standards-setting bodies are either unable or unwilling to approve new standards in time to meet market demands, carriers must have the ability to deploy reliable new technologies that provide consumers with additional

⁸⁹ 47 U.S.C. §706 (1996).

⁹⁰ *Id.*

choices. Consequently, regardless of the extent to which the Commission decides to rely upon standards-setting bodies to develop spectrum compatibility thresholds, it must not back away from the principle of having more than one means for carriers to deploy new services using new technologies.

B. THE COMMISSION SHOULD ADOPT A FACT-BASED SPECTRUM COMPATIBILITY REGIME

In the *Advanced Services Order*, the Commission proposed that national standards-setting bodies, like the ANSI-sponsored T1-E1.4 Committee, be relied upon (in the first instance) to develop industry standards for new advanced services technologies. Rhythms supports both the use of competitively neutral industry standards and the FCC's oversight of the standards development process. The scope and scale of existing and potential spectrum interference problems has been greatly exaggerated. For that reason, a combination of the Commission's spectrum compatibility presumptions and fast, fair, market-driven standards — approved by the Commission — is the approach most likely to produce the successful deployment by competitive carriers, while protecting the integrity of the network. The Commission should be careful not to adopt spectrum or binder group management rules that would unnecessarily micromanage loop deployment and present ILECs with an opportunity to impose anticompetitive rules on new entrants.

**1. Spectrum Interference is Largely a Myth
Perpetuated by the ILECs to Impose Anticompetitive Restrictions
on Competitors' DSL Technologies**

A fundamental misunderstanding that has permeated the initial comments in this docket is that spectrum “interference” between xDSL and POTS services or xDSL and other xDSL services is common and significant.⁹¹ In reality, just the opposite is true.

As discussed in detail in the attached affidavit of Rhythms Vice President Rand Kennedy, spectrum interference, or “crosstalk,” is caused by the electrical coupling between wire pairs in the same cable bundle, or in close proximity to each other.⁹² While crosstalk is an ever-present phenomenon associated with the transmission of electrical signals over a copper medium, it is well understood, predictable and, in fact, planned for in current network engineering procedures.⁹³ Low levels of crosstalk between lines has little or no negative impact on the quality of service carried over those lines, and is an every day occurrence.⁹⁴

In particular, it is virtually impossible that xDSL-based services could ever, under any conceivable network configuration, cause harmful interference with POTS services. First, because POTS traffic is switched, and xDSL traffic is not, these two services are rarely in close proximity at the central office.⁹⁵ That means that the opportunity for central office crosstalk — where transmission signals are at their strongest — between xDSL and POTS services is very low. Moreover, the Commission’s Part 68 rules prevent the use of any equipment in loop plant that could potentially interfere with POTS. Because every carrier and equipment manufacturer is required to comply with the Part 68 rules, which ensure that every device connected to the

⁹¹ See e.g., SBC Comments at 3 (“as penetration levels rise, a high probability exists that various services provided by multiple companies will interfere with one another to the detriment of all concerned.”)

⁹² Affidavit of Rand A. Kennedy attached hereto (“Kennedy Aff.”) ¶ 3.

⁹³ *Id.* ¶ 4.

⁹⁴ *Id.*

⁹⁵ *Id.* ¶ 5.

network cannot cause harmful interference to POTs, the potential for loop-to-loop interference that could affect POTS has already been addressed (successfully) by the Commission, and need not be re-raised here. Finally, the possibility of harmful crosstalk between xDSL-based services and POTS is especially remote in the case of ADSL and RADSL.⁹⁶ These xDSL technologies use frequencies *separate from and above* the frequencies used for POTS.⁹⁷ .

Despite SBC's comments to the contrary,⁹⁸ harmful crosstalk between, or among, different types of xDSL technologies is also rare. The xDSL medium has been specifically engineered to minimize crosstalk with other data services.⁹⁹ Line coding, power levels, spectral shaping and other tools are used to assist in managing compatibility with other technologies in the same cable bundle.¹⁰⁰ The xDSL technologies are also developed to be robust in the face of a potentially "loud" crosstalk environment.¹⁰¹ Indeed, the specifications of the various xDSL modes have been described so as to achieve each of their specified performance levels *in the face of the worst possible interference environment*. They are designed to produce signals at set speeds and distances, regardless of the presence of "worst case" interference scenarios.¹⁰² That is, standard xDSL transmission modes have been tested to ensure that they will perform to specification even in the presence, largely hypothetical, of the worst imaginable combination of loop technologies in the same or nearby binders.

⁹⁶ *Id.* ¶ 5

⁹⁷ *Id.*

⁹⁸ Attempting to rationalize its self-favoring binder management policies, SBC claims, without basis, that "[w]hile ADSL is a major interferer with other DSL technologies, it creates little interference with itself." SBC Comments at 8.

⁹⁹ *Id.* ¶ 6.

¹⁰⁰ *Id.*

¹⁰¹ *Id.*

¹⁰² *Id.*

Even when crosstalk *is* present between two loops carrying xDSL signals, it very rarely, if ever, causes data corruption in the signal carried on either loop.¹⁰³ A packet-switched network is designed to compensate for interference without loss of content. Nor does interference in xDSL services ever result in the desired data stream being replaced or taken over by an undesired data stream. Moreover, those flavors of xDSL that are “rate adaptive,” such as RADSL, synchronize at the highest achievable speed, and then automatically reduce speed in the presence of crosstalk in the transmit or receive frequencies.¹⁰⁴ Thus, these commonly deployed xDSL variants merely adapt themselves to their environment, regardless of the level of interference present, and virtually never lose content, merely slowing down if necessary to remain connected.

A further limitation on the potential impact of crosstalk on xDSL technologies is the so-called “near-end crosstalk” or (“NEXT”) effect. Because the impact of crosstalk is at its worst closest to the signal’s power source (typically in the central office), and the signal most likely to be impacted is the one furthest from its power source, the signal most likely to be impacted is that of the *incoming* or *upstream* transmit signal (which is furthest from its source on the user’s desktop and closest to the sources of other signals at the central office). For the most common xDSL variant, ADSL, this has two relevant results. First, as mentioned above, ADSL can be transmitted in a rate-adaptive mode, which means the *only* impact of crosstalk is a potential slowing of the upstream signal. Second, because ADSL is routinely used for Internet access, this potential slowing, if it has any effect at all, will impact affect a consumer’s upstream transmission. Because the upstream transmissions of most Internet users are simple text lines, or URLs (web site addresses), any reduction of speed would be transparent to the user, and have no discernible impact on the offered service.

¹⁰³ *Id.* ¶ 7.

Finally, the speeds and distances described in the specifications of the various xDSL services assume the highest possible level of interference, *i.e.*, that there are 49 interferors or disturbers adjacent to the desired signal within the same 50-pair cable. Even in such circumstances, each xDSL mode will achieve both the downstream and the upstream speeds described in that mode's specifications.

In sum, the potential for harmful interference between xDSL and POTS loops, or between xDSL loops themselves, is virtually impossible. To the extent it *might* occur, the likely result is negligible, *and is already accounted for in the service's specifications*. Thus, the ILEC "Chicken Little" predictions that DSL services will cause massive interference with voice services are pure hogwash. US West's claims, for instance, that spectrum interference can jeopardize "the quality and reliability of [ILEC] voice service" and "degrade the quality and reliability of the circuit-switched network" are false.¹⁰⁵ Armed with this technical awareness, the Commission should promulgate only those maximum spectrum compatibility and spectrum management rules, if any, that are actually necessary to maintain network stability.

2. The Commission's Compatibility Presumptions and Competitively Neutral Spectrum Management Standards Will Best Protect Against Any Interference Concerns

Rhythms urges the Commission to maintain its pro-competition presumptions regarding the usability of technologies that have either already been deployed successfully, approved by a state commission, or approved by a neutral standards-setting body.¹⁰⁶ Virtually all of the commentators agree that a neutral, industry-led spectrum compatibility standardization process is the most appropriate means for identifying the characteristics of non-harmful transmission

¹⁰⁴ *Id.* ¶ 7

¹⁰⁵ US West Comments at i, 5.

¹⁰⁶ Ameritech Comments at 13-15; Bell Atlantic Comments at 14-16; SBC Comments at 11.

technologies.¹⁰⁷ Rhythms disagrees, however, with the ILEC commentors regarding the sufficiency of current stand-alone industry standards-setting bodies.¹⁰⁸ Due to tremendous ILEC influence within the traditional standards-setting fora, the FCC must retain authority to review all final spectrum compatibility and management standards and adopt only those standards that are consistent with its policies of competitive and technological neutrality.

As several commentors recognize, ATIS/ANSI Working Group T1E1.4 has already established national standards for IDSL, HDSL, and ADSL/RADSL, and is currently working on national standards for other types of DSL, including SDSL and HDSL-2.¹⁰⁹ These standards include approval of power spectrum density (“PSD”) masks that describe “safe” and robust transmission technologies that can be deployed, interchangeably with each other, with little concern of proximity or number.¹¹⁰ Separately, Working Group T1-E1 has also recently issued by letter ballot proposed spectrum compatibility standards that would theoretically provide technology-neutral PSD masks, deployment rules and loop assignment rules for seven different categories of advanced services technologies. These PSD masks, when final, are expected to provide the power/frequency guidelines for interference-safe deployment of advanced services.

Generally, PSD masks not only describe the total power that can be transmitted over a line, they also place controls on how much power can be transmitted at any given frequency in the passband — preventing inappropriate increases in power at the lower frequencies that allow greater signal reach.¹¹¹ Thus, the process of creating acceptable PSD masks is a useful means of describing power/frequency combinations that are guaranteed to be robust in the network without

¹⁰⁷ See e.g., GTE Comments at 6-8; US West Comments at 5; Ameritech Comments at 13-15; Bell South Comments at 29-30.

¹⁰⁸ Ameritech Comments at 13-15; Bell Atlantic Comments at 14-16; SBC Comments at 11.

¹⁰⁹ See e.g., US West Comments at 5-7.

¹¹⁰ Kennedy Aff. ¶ 10.

¹¹¹ *Id.*

negatively impacting other services. A properly run, competitively neutral spectrum compatibility standards-setting process would apply manufacturer-neutral technical specifications that assume worst case crosstalk conditions.¹¹² As a result, standards-based PSD masks can present a conservative and prophylactic spectrum compatibility regime without requiring either the Commission or the ILECs to micromanage the network or those carriers seeking to provide services over it.¹¹³

In order to ensure the success of a PSD mask approach, however, three steps must occur. First, as is discussed below in more detail, the Commission must play an active role overseeing the development and adoption of spectrum standards in order to ensure the competitive neutrality of the results. Second, where technology-neutral spectrum compatibility standards already exist, carriers must be required to conform to these standards in order to enjoy the benefits of the Commission's presumption of non-harmfulness.¹¹⁴ Third, ILECs cannot be permitted to impose unilateral variants, alternatives or "subsets" of industry-standard PSD masks. Only where the PSD masks are truly neutral and all carriers comply with them will the protective value of the mask approach take full effect.

3. Aggressive Spectrum or "Binder Group" Management Rules Are Not Necessary and Are Impossible to Implement

The Commission also sought comment on "how to maximize the deployment of new technologies within binder groups while minimizing interference."¹¹⁵ In response, the ILECs have sought a fairly wide variance of responsibility and control for spectrum management. US West, Bell South and Bell Atlantic apparently see little need for specific binder group manage-

¹¹² *Id.* ¶¶ 11,15.

¹¹³ US West Comments at 8.

¹¹⁴ *Advanced Services FNPRM* ¶ 67.

¹¹⁵ *Advanced Services FNPRM* ¶ 86.

ment procedures.¹¹⁶ GTE argues against specific management rules, but ultimately states that “responsibility for network reliability and integrity” should be assigned to the “facility owner,”¹¹⁷ while Sprint and SBC seek near blanket authority to set rules regarding spectrum management, including the right to suspend CLEC services pending resolution of spectrum compatibility disputes.¹¹⁸ In reality, under both the Commission’s interim presumptions and the proposed permanent industry standard PSD masks, *no* affirmative spectrum management policies are necessary.

Harmful spectrum interference is rare in an xDSL environment, and will be even more so with the application of spectrum compatibility tools such as PSD masks. Because xDSL technologies can have little or no harmful effect on existing voice and data services or on each other, there is no need for obtrusive spectrum management rules above and beyond an effective spectrum compatibility regime. The proper application of spectrum compatibility policies (PSD masks, approval of technologies by regulatory bodies, or prior successful deployments) creates a benign yet prophylactic effect with regard to interference. With these steps in place, the likelihood of interference is reduced to so slim a possibility that further management efforts are economically inefficient and more likely to be used for anticompetitive results than for actual gains in network protection. The Commission should thus bar the implementation of such practices by any ILEC.

The most egregious spectrum management policy proposals advanced by ILECs involve binder group management (“BGM”) or selective feeder selection (“SFS”) — the separation of

¹¹⁶ US West Comments at 6-8; Bell South Comments at 29-30; Bell Atlantic Comments at 19 (“the Commission incorrectly assumes that every binder group must be actively managed to facilitate the deployment of new technologies. However, such binder group micro-management is unnecessary in light of the spectrum compatibility standards under development by Committee T1.”)

¹¹⁷ GTE Comments at 11.

pair ranges in loop feeder cable to prevent xDSL technologies from being deployed in the same range.¹¹⁹ These procedures are an inefficient, wasteful and potentially anticompetitive solution to a problem that, by and large, does not exist.¹²⁰ They are also competitively biased and discriminatory against data CLECs, most of whom (unlike ILECs) do not limit their advanced services technologies to only ADSL. For example, the application of BGM/SFS procedures for ADSL, as proposed by SBC, Sprint and Ameritech,¹²¹ would by definition limit the availability of loops for non-ADSL offerings.¹²² Feeder cables often periodically branch off into several directions with smaller cables (with fewer pairs) as they get further from the central office. This branching tends to increase the chances that loops will be unavailable for non-ADSL loops because the segregated ADSL binder groups will tend to occupy a higher percentage of the total binder groups on the branches.¹²³ As binder groups get closer and closer to their destination, it is possible that virtually all available binder groups would be categorized either “ADSL” or “non-ADSL,” precluding carriers from providing the alternative technology to any customer served by those binder groups.¹²⁴

Not only are BGM/SFS rules anticompetitive, they are nearly impossible to implement.¹²⁵ Current ILEC binder reinforcement rules generally provide that ILECs will add binders to the feeder plant only when they expect 90% or more of the plant to be in use by the time the reinforcement is placed. As a result, where ILECs are required to segregate binders by technology,

¹¹⁸ SBC Comments at 8-9; Sprint Comments at 3-4 (“different technologies should be segregated into their respective binder groups within the feeder cable.”)

¹¹⁹ SBC Comments at 8-9; Sprint Comments at 3-4.

¹²⁰ Kennedy Aff. ¶¶ 2-9, 14.

¹²¹ See e.g., Ameritech Comments at 18.

¹²² Kennedy Aff. ¶ 14.

¹²³ *Id.*

¹²⁴ *Id.*

¹²⁵ *Id.* ¶ 14; Bell Atlantic Comments at 21; Bell South Comments at 28 (“Bell South does not have the administrative tools in place to administer cable in this manner. A system to meet these types of administrative burdens would overwhelmingly tax Bell South.”)

binder availability would be seriously compromised and incumbents would be forced to refuse deployment requests that they would provide in an unrestricted environment. In addition, several ILECs admit that they lack sufficiently accurate or current records — much less the necessary administrative capability — to manage binder groups.¹²⁶

Finally, binder management rules are unnecessary because they imply that CLECs somehow have less economic incentive than the ILECs to avoid harmful deployment. They ignore the fact that for CLECs, pushing the limits of PSD masks is self-defeating. CLECs need networks stability and performance just as much as ILECs. In fact, spectrum management policies only make sense as a mechanism for anticompetitively segregating portions of the loop plant for ILEC use, and for creating an unnecessary bottleneck effect by isolating part of plant for specific uses.¹²⁷

Rather than limit the accessibility of the network via BGM/SFS procedures, the Commission should require widespread distribution of advanced services technologies.¹²⁸ Because xDSL technologies are designed and standardized to work in worst-case crosstalk scenarios, a wide distribution of the technologies will, *by definition*, fit within the technologies' design parameters—without the efficiency and competitive costs associated with BGM/SFS practices. The incumbent LEC's AMI T-1 lines are the only technology where binder group management does make sense.¹²⁹ The upstream and downstream AMI T-1 signals have such a negative impact on each other that they must be kept in non-adjacent binder groups.¹³⁰ Most ILECs already implement such a procedure for their repeatered T-1 lines. The Commission should thus require binder separation of AMI T-1 lines, but should also initiate a separate rulemaking on the

¹²⁶ Bell Atlantic Comments at 21; Bell South Comments at 28.

¹²⁷ CITE AT&T and other CLECs.

¹²⁸ Kennedy Aff. ¶ 15.

most appropriate means for eventually eliminating AMI T-1 lines from the legacy networks. As the *FNRPM* recognized, AMI T-1 is the most interfering technology deployed today.¹³¹ Their use should be eliminated as soon as practicable.

For the same reasons that Rhythms generally opposes binder management rules, it opposes excessive obligations regarding technology data exchange. With a fully operational spectrum compatibility regime in place (including competitively-neutral PSD masks), the only deployment information that carriers should be required to supply to ILECs is the identity of the PSD masks under which the carrier plans to offer service. Any further requirement, such as information regarding the “flavor” or speed of technology the carrier intends to deploy, is unnecessary and forces the CLEC to disclose competitively-sensitive proprietary information.

Unless and until an ILEC can demonstrate that a carrier is violating its commitment by offering service that does not comply with its stated PSD masks, the ILEC must be required to presume a lack of network harm and permit deployment. Where an ILEC alleges a violation by a carrier of its PSD mask commitments, the ILEC must be required to demonstrate the violation to a state PUC or the Commission *prior* to denying or blocking service. The Commission should impose treble damages on any ILEC who denies or turns-off a carrier’s service on improper spectrum management grounds.

Likewise, Rhythms disagrees with the Commission regarding the need for ILECs to collect and report to CLECs on the technical make-up of loops in specific binder groups.¹³²

Although Rhythms firmly believes that the ILECs have an obligation to provide pre-ordering loop make-up data sufficient to accurately and effectively order xDSL-capable loops, it does not

¹²⁹ *Id.* ¶ 13; Bell Atlantic Comments at 21; Ameritech Comments at 18.

¹³⁰ *Id.* ¶ 13.

¹³¹ *Id.* ¶ 74.

believe there is a useful spectrum management purpose in requiring the ILECs to collect and report binder-by-binder technology types.

C. THE COMMISSION CAN AND MUST RETAIN CONTROL OF THE SPECTRUM MANAGEMENT STANDARDS-SETTING PROCESS

1. T1-E1 is currently “captured” by ILECs

The Commission sought comment about whether ATIS Working Group T1-E1 is the most appropriate organization to develop spectrum management standards.¹³³ At issue is whether T1-E1 is a sufficiently neutral entity for promulgation of industry-wide rules.

Rhythms supports the use of industry-led organizations such as Working Group T1-E1 as important, even primary, contributors to the development of an appropriate PSD mask-based rule for spectrum compatibility. However, the Commission can and should recognize that T1-E1 remains disproportionately represented by ILECs, thus unduly influenced by ILEC-related concerns, and therefore cannot be entrusted to single-handedly produce competitively-neutral PSD masks for CLECs and ILECs alike.

The notion that Working Group T1-E1 is a competitively neutral entity is a fallacy. T1-E1 is a subcommittee of the Alliance for Telecommunications Industry Solutions, Inc. (“ATIS”), and its standards committee, Committee T1. In its comments in this docket, ATIS purports to ensure “a balanced membership” of Committee T1 and its working groups, “without dominance by any single interest.”¹³⁴ ATIS goes so far as to attach to its comments roughly 75 pages of Committee T1 and Working Group T1-E1 membership and participation lists, both comprised of a diverse set of companies.¹³⁵ However, nowhere in its comments does ATIS disclose the ATIS membership list, or the conditions for membership. One possible reason for these missing facts

¹³² *Advanced Services FNPRM* ¶ 73.

¹³³ *Id.* ¶ 85.

¹³⁴ ATIS Comments at 5-6.

may be that a quick look at the membership list of ATIS — the parent organization of Working Group T1-E1 — shows that ATIS is almost completely comprised of ILECs. Of the approximately 100 members listed on the ATIS web site on July 21, 1999, more than two-thirds are incumbent local exchange carriers, and several more are ILEC vendors.

A direct result of the skewed ILEC participation level in ATIS is the inherently pro-ILEC sympathies of the ATIS staff. For instance, certain members of Committee T1 and its various working groups, including namely data CLECs, were not given an opportunity to participate in drafting or editing the ATIS comments (which not unexpectedly are in lock-step with the ILEC positions. Thus, Committee T1 members, including NorthPoint, Covad and AT&T, have submitted separate comments directly contrary to those of ATIS.

In addition, the unified ATIS/ILEC descriptions of the “diverse” make-up of T1-E1 are misleading.¹³⁶ ILECs contribute a disproportionate percentage of resources toward running Committee T1,¹³⁷ and are capable of mustering significant votes from captive vendors who participate only to support their largest customers, the ILECs.

For instance, over the last 27 months, various CLECs and their vendors have sought a T1-E1 standard for a single-carrier ADSL technology, while the ILECs have favored a competing, discrete “multi-tone” ADSL approach. Time after time, the ILECs and their vendors have mustered the votes necessary to block the single carrier approach, and only this past June, after more than two years of fighting, agreed to release a technical report, or status report, on single-carrier ADSL. This delay has placed CLECs at a competitive disadvantage and is exactly the

¹³⁵ ATIS Comments at Attachment D.

¹³⁶ ATIS Comments at 2-8; SBC Comments at 9-10; Bell South Comments at 29 (“While a number of representatives of incumbent LECs participate in T1-E1.4, they do not dominate the group”).

¹³⁷ GSA Comments at 5.

kind of result Commission standards development participation can prevent.¹³⁸ These examples and the many others discussed by NorthPoint make clear that the Commission cannot simply defer to or adopt the T1-E1 outcomes.¹³⁹

2. The Commission Can and Should Retain Control of the Spectrum Compatibility Standardization Process

Currently the Commission's rules rely on a general presumption that new technologies that have been standardized, approved or deployed successfully, will not harm the network.¹⁴⁰ Working Group T1-E1 has already produced a number of technical standards (including PSD masks) for certain advanced services technologies, and is currently in the process of preparing PSD masks and rules for the specific purpose of spectrum compatibility.

There is a growing risk that the Commission's competitively-neutral short-term rules for spectrum compatibility will be replaced through T1-E1 by a long-term policy that will make a mockery of the *Advanced Services Order*. PSD masks are the best and most efficient means for addressing any potential concerns regarding spectrum interference. PSD masks that are unbiased both as to technology and provider — that are competitively and technologically neutral — combine the dual goals of promoting rapid deployment of advanced technologies while preserving the high quality of the legacy phone network. Because of the critical importance of the PSD-mask-setting process, the Commission must take charge of it.

Committee T1 and other industry-based standards-setting bodies are the appropriate first step to the Commission eventually adopting nationwide spectrum compatibility PSD masks and rules. Industry can provide needed technical resources and market data to start the process. In fact, this first step is critical to the development quick and valuable standards. To ensure the

¹³⁸ This is but one example of several. See, e.g., NorthPoint Comments at 43-44.

¹³⁹ NorthPoint Comments at 43.

competitive neutrality of this initial stage, the Commission should send (under its Section 256 authority)¹⁴¹ direct representation to the T1-E1 meetings and encourage participation by any interested state commissions.

Ultimately, however, the Commission must retain for itself the role of establishing permanent spectrum compatibility rules. This does not mean that the Commission should itself develop standards, because this would raise a host of resource, institutional and policy issues. Rather, the Commission should request from a wide variety of entities, including Working Group T1-E1, technical recommendations for specific PSD masks and rules for spectrum compatibility. The Commission should then seek expedited public comment on all proposed recommendations and proceed to adopt permanent spectrum compatibility rules that meet its policies for competitive and technological neutrality. In making its standards-setting decisions the Commission should apply its “significant degradation” test, viewing service degradation from the perspective of the end user.¹⁴²

The Commission has authority under the Communications Act of 1934 and its own precedent to consider industry-promulgated technical specifications and procedures for the purpose of setting network interconnection and access rules.¹⁴³ For instance, in its DTV orders, the Commission adopted DTV standards “where appropriate” despite its general policy to “refrain[] from regulation.”¹⁴⁴ However, to “ensure a smooth transition” the Chairman specifically acknowledged “that by modifying this standard, we gave the marketplace an opportunity to pick

¹⁴⁰ *Advanced Services Order* ¶¶ 66-69.

¹⁴¹ 47 U.S.C. §256.

¹⁴² *Advanced Services FNPRM* ¶ 66. n.166. See also NorthPoint Comments at 35.

¹⁴³ See Rhythms Comments at 16-17 citing *Intelligent Networks*, Notice of Proposed Rulemaking, 8 FCC Rcd. 6813, 6820 n.64 (1993); Sprint Comments at 2 citing *Toll Free Service Access Codes* 12 FCC Rcd. 11162 (1997) and *Telephone Number Portability*, 12 FCC Rcd. 7236 (1997); MCI Comments at 2-5 citing 47 U.S.C. §256; NorthPoint Comments at 47 citing *In the Matter of Administration of the North American Numbering Plan*, CC Docket No. 92-237, *Report and Order*, FCC 95-283 (July 13, 1995).

a winner.”¹⁴⁵ In addition, the Commission’s longstanding and highly successful Part 68 Rules state that “[t]he purpose of the rules and regulations in this part is to provide for uniform standards for the protection of the telephone network from harms caused by the connection of terminal equipment and associated wiring thereto.”¹⁴⁶ The spectrum compatibility PSD masks and line assignment rules contemplated here are entirely consistent with the purpose of the Part 68 Rules. Similarly, under Sections 201 and 202 of the Act,¹⁴⁷ the Commission can overrule ILEC practices (such as binder group management and unilateral PSD Masks) that are “unreasonable.”

Thus the Commission can and should participate in industry standards-setting activities and reserve authority to review and approve final spectrum compatibility and management standards.

¹⁴⁴ *Advanced Television Systems and Their Impact on the Existing Television Service*, Fifth Report and Order, MM Docket No. 87-268, FCC 97-116, ¶ 2 (rel. Apr. 21, 1997).

¹⁴⁵ *Id.* at 12,954 (separate statement of Chairman Hundt).

¹⁴⁶ 47 CFR §68.1.

¹⁴⁷ 47 U.S.C. §§ 201-201.

CONCLUSION

For all these reasons, the Commission should adopt a rule requiring ILECs to provision line sharing to data CLECs, under appropriate federal pricing guidelines, and should reject ILEC efforts to impose anticompetitive spectrum compatibility or management standards on competitive DSL technologies.

Respectfully submitted,
RHYTHMS NETCONNECTIONS INC.

Jeffrey Blumenfeld
Vice President and General Counsel
Rhythms NetConnections Inc.
6933 South Revere Parkway
Englewood, CO 80112
303.476.2222
303.476.5700 facsimile
<jeffb@rhythms.net>

By: _____
Glenn B. Manishin
Christy C. Kunin
Stephanie A. Joyce
Frank V. Paganelli
Blumenfeld & Cohen – Technology Law Group
1615 M Street, N.W., Suite 700
Washington, D.C. 20036
202.955.6300
202.955.6460 facsimile
<glenn@technologylaw.com>

Attorneys for Rhythms NetConnections Inc.

Dated: July 22, 1999

**Before the
Federal Communications Commission
Washington, D.C. 20554**

In the Matter of)
) CC Docket No. 98-147
Deployment of Wireline Services Offering)
Advanced Telecommunications Capability)

AFFIDAVIT OF RAND A. KENNEDY

QUALIFICATIONS

1. My name is Rand Kennedy. I am the Vice President of Engineering for Accelerated Connections, Inc, d/b/a ACI Corp. ("ACI"). My business address is 7337 South Revere Parkway, Suite 100, Englewood, Colorado 80112. My responsibilities include managing the technologies used to provision Digital Subscriber Line ("DSL")-based services to ACI's customers, and overseeing the physical build-out of ACI's network on a nationwide basis. I hold an Electrical Engineering Degree from Ohio State University. Prior to joining ACI, I was employed by CompuServe, where I was responsible for network technology and network planning.

SPECTRUM INTERFERENCE

2. Telecommunications signals for both Plain Old Telephone Service ("POTS") and DSL-based services are carried in whole or in part on copper loop plant facilities. These copper loops are deployed in feeder and distribution cables of varying sizes. Within the loop cables, the wire pairs are twisted to reduce the effects of crosstalk and other types of

interference. When commenters in this docket reference “spectrum interference,” they are normally referring to crosstalk.

3. Crosstalk in the loop plant has been a known and well-understood phenomenon for decades. Some level of crosstalk is always present, even if the only service in the loop plant is POTS. Crosstalk is caused by the electrical coupling between wire pairs in the same cable bundle. The amount of crosstalk is highest between two loops that are right next to each other, and decreases as the two loops are located farther apart within the cable bundle or in other bundles in the cable. The crosstalk model for the loop plant is built on a conservative model of 1% near-end crosstalk. That is, only 1% of the time will crosstalk from all sources reach a level that requires examination. The model is made more conservative by being based on a worst-case 50 pair bundle, although the vast majority of bundles in the loop plant are made up of 25 pairs. A recent Bellcore (now Telcordia) study has found the model to have an error of several dBs, which makes it even more conservative.
4. Crosstalk cannot be eliminated, and there is no need even to attempt to do so. Instead, the technologies used to provide telecommunications services, including POTS, have been designed to take account of the presence of crosstalk, so that crosstalk does not create harmful interference or significant degradation of the signal. There are a number of ways to limit crosstalk. These methods have been incorporated into the various DSL standards to ensure that multiple technologies can co-exist in the same loop cable bundles. As new DSL technologies are introduced, a similar type and level of scrutiny is used to ensure continued spectral compatibility.

5. Harmful crosstalk between DSL-based services and POTS is extremely unlikely, and in most cases essentially impossible, for several reasons. First, POTS traffic is switched traffic that transits ILECs' and other carriers' switches and the network of circuits between such switches. xDSL-based data traffic, however, whether carried by CLECs or ILECs, is *not* switched at the ILEC's end office. Instead, it is split off from circuit-switched traffic at the CLEC or ILEC DSLAM in the central office before it reaches the switch, and is carried on separate trunk groups via a separate packet-switched network. Thus, there is no interaction between xDSL-based services and POTS in carrier switches and networks. Indeed, removing xDSL data signals from the switched network actually tends to increase the reliability of the switched network, because it reduces the demand placed upon the circuit switching equipment and interoffice facilities. In addition, the only portion of the ILEC network in which POTS and xDSL-based data services are in proximity to each other in a manner that *might* cause interference with POTS, is the loop between the serving central office and the customer's premises. However, the FCC dealt with such *potential* for harmful interference long ago, when it established its Part 68 Rules. *All* telecommunications equipment, including xDSL equipment, must comply with the provisions of Part 68 *before* it can be deployed. Harmful interference between xDSL and POTS is therefore precluded. Moreover, equipment manufacturers take very seriously their responsibility to produce equipment that takes full account of the existence of legacy services in the loop plant, and are careful to design their equipment specifically to avoid harmful interference with POTS. The possibility of harmful crosstalk between DSL-based services and POTS is especially remote in the case of ADSL and RADSL.

These DSL technologies use frequencies *separate from and above* the frequencies used for POTS.

6. Harmful crosstalk or other interference between different types of DSL is also unlikely.

This issue was foremost in the minds of telecommunications experts when the first DSL standard, ISDN, was developed. ISDN was echo-cancelled to limit the frequency spectrum used. Care was taken to ensure operational and spectral compatibility in the presence of legacy services such as POTS, DDS, switched 56 kb/s service, and adjacent binder T-1. As succeeding technologies, such as HDSL, ADSL, SDSL, and G.lite, were envisioned, the standards were again developed to be spectrally compatible with existing services. Line coding, power levels, spectral shaping, and other tools were used to assist in managing compatibility with other technologies in the same cable bundle. To ensure compatibility, long loops were defined with demanding crosstalk scenarios. That is, loop transmission technologies were designed to be sufficiently robust to perform at specified levels despite the presence of worst case crosstalk or noise levels. Thus products meeting historic industry standards have are able to perform in adverse environments.
7. Even when crosstalk is present between two loops carrying DSL signals, it does not cause data corruption in the signal carried on either loop. DSL transceivers, and the network protocols used in packet switching, are designed to compensate for such crosstalk via error correction. In addition, several types of DSL, including ADSL and RADSL, are “rate adaptive.” That is, they synchronize at the highest achievable speed, and then automatically reduce the transmission speed in the presence of crosstalk in the transmit or receive frequencies. Thus, the main effect of significant crosstalk will be somewhat slower transmission speed.

8. Some types of DSL technology, such as ADSL, are Near-End Crosstalk (“NEXT”)-limited. Some ILECs have asserted that other types of DSL signals transmitted from the central office can negatively affect ADSL signals. This claim is misplaced. ADSL equipment designed to meet ANSI ADSL standards will perform properly, even in the presence of numerous other DSL signals emanating from the central office. Moreover, any impact of DSL transceivers in the central office will be on the upstream (i.e., from the customer premises to the central office) signal only. As a result, users are unlikely to notice any difference in performance, because ADSL is used largely for Internet access, and the upstream traffic generally consists of keystrokes by the end user, which require very little bandwidth.
9. The only high-bandwidth technology that poses any real risk of significant degradation for DSL-based services is Alternate Mark Inversion (“AMI”)-based T-1s. AMI T-1s are an extremely interfering technology, both self-interfering and interfering with other DSL technologies. AMI T-1s require special deployment techniques, including the physical separation of transmit and receive pairs. The industry has learned a hard lesson from AMI T-1s, and has progressed a great deal since the days of AMI T-1s. All high-bandwidth xDSL technologies developed since then have been intentionally designed to coexist harmoniously with other data and POTS services, *without* a need for the special treatment required by AMI T-1s.

THE NATIONAL STANDARDS-SETTING PROCESS

10. The telecommunications industry has been establishing national standards for high-speed data services for quite a while. As I noted above, each xDSL technology has been designed to co-exist with POTS and legacy-protected technologies above the voice band.

Each xDSL standard was developed to be spectrally compatible with other xDSL technologies by controlling the power of the transmitted signal, spectral shaping, and placing limits on the out-of-band energy. Power spectral density (“PSD”) masks were developed to control the energy placed on the loop so that spectral compatibility could be accomplished. While standards provide limits for the total power that can be transmitted, a PSD mask is also needed to place controls on how much power can be transmitted at any given frequency in the passband (the frequency spectrum in which the xDSL signal is transmitted). This is needed because a product could meet the total power limit, yet place most of its power in the lower frequencies that give better reach. In addition to limiting the amount of power that can be transmitted at any frequency, the PSD mask also controls how much power is allowed in the spectrum outside of the passband.

11. ATIS/ANSI Working Group T1E1.4 has established national standards for IDSL, HDSL, and ADSL/RADSL, and is currently working on national standards for other types of DSL, including SDSL and HDSL-2. These national standards include the transmit power limits and PSD masks discussed above. The standards are developed using near-worst-case crosstalk scenarios (for example, the HDSL specification assumes the presence of 49 other DSL services in the same binder group). This approach ensures that DSL technologies have standard sets of characteristics, are spectrally compatible, and can be deployed throughout the loop plant without any special treatment.

SPECTRUM MANAGEMENT ISSUES

12. A few parties, most notably SBC, have recently suggested that special spectrum management techniques, originally called “Binder Group Management” and now called “Selective Feeder Separation” (“BGM/SFS”), are needed for some DSL technologies.

- BGM/SFS would give special treatment to loops carrying ADSL signals, by assigning them to separate pair ranges in loop feeder cables and not allowing any other DSL technology to be deployed in that pair range.
13. The only type of high-speed data technology for which BGM/SFS is legitimate is AMI T-1s. The upstream and downstream T-1 signals of this four-wire technology impact each other so severely that they are required to be in non-adjacent binder groups. This means that there must be at least one binder between the binder containing the upstream signals and the binder containing the downstream signals. This method of management has worked well with T-1 because bundles of 25 pairs at a time are generally used. The loops in the 25-pair bundle are spliced in and out of the apparatus case that holds repeaters every 3000 feet or so along the length of the loop, depending on loop gauge. Splicing the 25-pair binder in and out of the apparatus cases creates an open circuit in the loop. This provides a natural barrier to other technologies being installed in the same binder.
14. Use of this technique for other technologies, however would be inefficient, expensive, and difficult or impossible to maintain. First, such a program would reduce the number of loops available for other xDSL services because of the simple realities of loop plant engineering and provisioning. The more an undifferentiated resource, such as the feeder plant cable, is carved up into binder-group-specific uses, the fewer overall pairs will be available for other xDSL services, because the ADSL-specific binder groups will never all be totally filled with ADSL-equipped pairs. In addition, feeder cables often periodically branch off into several directions in smaller cables (with fewer pairs) as they travel out from the central office. This branching increases the likelihood that there will be fewer pairs available for non-ADSL use, because the segregated ADSL binder groups

will tend to occupy a higher percentage of total binder groups on each of these branches. In the worst case, a feeder branch consisting of only a few binder groups might become completely dedicated to ADSL, thereby precluding the deployment of other xDSL technologies. Moreover, the ILEC usually reinforces a cable route only after most of the pairs (usually 90%) have working lines. By using different binders for different services, a special burden would be placed on the loop assigner and the outside plant engineer to provide loops for different types of services while maintaining an adequate supply of vacant pairs in each type of binder. Many of the ILECs' outside plant records are not accurate or current. Held orders would very likely upset the process and create undesirable shortcuts to provide service. The BGM/SFS approach has been considered by other ILECs and discarded.

15. It is important to keep in mind that all DSL technologies have been designed with the full knowledge that they would be deployed in the loop plant along with other existing services that would present crosstalk to these new services. Indeed, each new data service had its performance specifications established under conditions of near-worst-case crosstalk presented by the high-speed data services on adjacent pairs. Thus, each new type of DSL is intentionally designed to take the loop plant as it finds it – and worse – and to achieve the performance of the design specifications without any need for the kind of intrusive spectrum management efforts represented by BGM/SFS. Rather than undertake a BGM/SFS approach, the best way to maximize the number and type of DSL-based services that can be deployed in the loop plant is to spread them as broadly as possible within the feeder and distribution cables, and to adhere to the design

- assumptions and parameters of each data service (e.g., employ conservative reach/speed combinations, and do not violate the service's design assumptions).
16. While ILECs should not employ BGM/SFS, they should address the problems caused by AMT T-1s. The most effective form of spectrum management that ILECs could undertake would be to eliminate the aged AMI T1s in their loop plant. Such an approach is the single most effective way I can think of to increase the capacity of the loop plant to handle additional high-speed data services based on modern technology such as ADSL/RADSL, IDSL, SDSL, and HDSL.

I declare under penalty of perjury that the foregoing is true and correct. Executed on July 21, 1999.

Rand A. Kennedy